EUPHORBIACEAE NOVAE VEL CRITICAE COLOMBIANAE, III

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Croton Linnaeus

Croton pungens Jacq., Ic. Pl. Rar. 3: Tab. 622, 16. 1786-1793; Muell.-Arg. in DC. Prodr. 15^2: 540. 1866.

Croton pungens var. *rhomboidalis* Muell.-Arg. in op. cit. 541. Syn. Nov.

Croton timotensis Pittier in Jour. Wash. Acad. Sc. 2: 5. 1930. Syn. Nov.

The southern limit of this species, or one of its forms, is the Eastern Cordillera in the Department of Cundinamarca: Puente de Serviez, 1940 m. alt., *Cuatrecasas 7920*. It is also found on hills of sparse vegetation or in woods in the Department of Santander (*Killip & Smith 16789*: between Suratá and California, 1740-2000 m.; *Killip & Smith 16843*: vicinity of California, 2000 m.; *Killip & Smith 17030*: same locality) and in the Department of Norte de Santander (*Killip & Smith 19769*: vicinity of Pamplona, 2300-2400 m.; *R. E. Schultes & E. Smith 12087*: La Cabuya, región del Sarare, 1300 m.). The type of *C. timotensis, Pittier 12646,* collected in Venezuela near Timotes, Mérida, 2000 m., cannot be separated from *C. pungens genuinus* Muell.-Arg. (in Linnaea 34: 89. 1865; in DC. Prodr. 15^2: 541. 1866), not even as a variety. It is true that the collection upon which Pittier's species is based seems to be more hairy, and has a more marked yellowish color than other species, but there is no difference whatsoever between the plant from Timotes and that from Norte de Santander and the one from near Caracas, type-locality of *Croton pungens* Jacq. (see *Pittier 12646, Killip & Smith 19769, Pittier 12279, Eggers 83437*). The ash-grey form, with thinner and, perhaps, less hairy leaves, is found in Estado Miranda (*Fendler 1214-a*), in the vicinity of Caracas, Cerro de Galipán (*Pittier 220*), Las Adjuntas (*Pittier 517*) in Venezuela, and in Colombia: Dept. Santander (*Killip & Smith 17030*) and Dept. Norte de Santander (*R. E. Schultes & E. Smith 12087*). It is, I believe, this ash grey form that Mueller described as var. *rhomboidalis.* No forms like *C. pungens* are found south of Cundinamarca, other forms taking its place in Peru and northern Bolivia (e. g. *C. tarapotensis* Muell.-Arg.). However, *C. sarcopetalus* from southern Bolivia and northern Argentina is so similar to *C. pungens,* that it may be easily confused with Jacquin's species when the locality is not indicated. This has important significance for the study of the distribution of vegetation in South America.

Croton leptostachyus HBK., Nov. Gen. & Sp. Pl. 2: 63 (79). 1817; Muell.-Arg. in DC. Prodr. 15^2: 610. 1866.

The study of this group has placed before me a sharp alternative: (a) To present a provisional outline of its classifacation, trusting that this outline will materially help investigators better placed than I am; (b) To delay publishing anything until I myself have everything needed to work out the issue in full. Considering that without field-work and careful experimental cultivation all these plants cannot be satisfactorily dealt with, I prefer to present a provisional outline, as I do whenever means to conduct exhaustive work are not forthcoming.

Croton leptostachyus involves as a single closely related group of forms: (1) *C. ferrugineus* HBK.; (2) *C. Holtonis* Muell.-Arg.; (3) *C. malacophyllus* Benth.; (4) *C. dolichostachyus* Pittier; (5) *C. truxillanus* Pittier and (6) *C. meridensis* Croizat. In addition, its relationships are extensive in the direction of many species of Ecuador and Peru. A rough estimate is that about twenty to thirty binomials lie in this vicinity, and that this affinity, broadly understood, is very important for the study of American species of *Croton.*

For the purpose of this treatment, I will briefly review only the Colombian and Venezuelan forms, in the order in which I have enumerated them above.

(1) **Croton leptostachyus** HBK.

The type-locality is near Honda, Dept. of Tolima. This plant is represented by: *Pennell 3572*, Tolima, Honda, 300-400 m.; *Pérez-Ar-*

beláez & Cuatrecasas 6493, Tolima, Llanos del Tolima, Curvas de Gualanday; *Cuatrecasas 8044,* Cundinamarca, Fusagasugá, 1800 m. The pubescence is marked, subhispidulous.

(2) **Croton ferrugineus** HBK. Nov. Gen. & Sp. 2: 61 (77). 1817; Muell. Arg. in DC. Prodr. 15^2: 611. 1866.

The type-locality is "In regione calida Regni Novogranatensis prope Carthagena de Indias". Humboldt and Bonpland visited both Cartagena, in the Caribbean Coast, Dept. of Bolívar, and Cartago, in the Cauca Valley, Dept. of El Valle (see Sprague, Kew Bull. 1926: 26-27. 1926). I have seen the holotype, secured from the herbarium of Berlin before the outbreak of the war, and I am almost certain that it was collected in El Valle, not around Cartagena, Bolívar, where plants of the kind do not grow. I do not exactly match the holotype with the material I have at hand, but it is fairly close to *Pérez-Arbeláez & Cuatrecasas 6431* from Dept. El Valle, Hacienda Valparaíso (Zarzal-Bugalagrande), 1070 m. and *Hermano Daniel 2280* from Dept. of Antioquia, San Gerónimo. It differs from these two collections mostly in the nature of the upper face of the blade. This is glabrous, more or less papillate in *Pérez-Arbeláez & Cuatrecasas 6431,* pubescent with appresed subsetulose subsimple hairs in *Hno. Daniel 2280;* in the holotype it is fairly thickly stellate-pubescent. These variations may not be very important in this group, but cannot be overlooked entirely, for the "species" is here a mere loose aggregate of populations and local forms, with characters variable in an amazing degree, *so far as the herbarium shows.* On the whole, *Triana 5827-2* (Herb. Nac. Colomb.; probably the same as *Triana 3623* cited by Mueller Argoviensis under *C. ferrugineus elegans,* loc. cit.) collected near Pasto, Dept. of Nariño, is better reminiscent of the holotype in its orangeish color and pubescence than any other specimen so far known to me. I much regret that I have not seen material collected in the Departments of Cauca and Nariño, suspecting as I do that the true *C. ferrugineus* ranges above 1500 meters in the Western Cordillera from Ecuador to El Valle in Colombia, gradually merging northward with slightly different forms, and being connected soutward with a galaxy of forms endemic to Ecuador and Peru. This suspicion is borne out by the fact that *Lehmann 683* from "Das Rio" (*sic,* probably Dos Ríos) likely to have been collected in the Dept. of Cauca, well agrees with *Triana 5287-2* and the holotype.

(3) **Croton Holtonis** Muell.-Arg. in Linnaea 34: 609. 1865; in DC. Prodr. 15^2: 610. 1866.

The type locality is la La Paila, El Valle. This form is strongly reminiscent of *C. rivinaefolius* HBK. Nov. Gen. & Spl. Pl. 2: 64 (80). 1817; Muell.-Arg. in DC. Prodr. 15^2: 628. 1866), which is probably identically the same as *C. Pavonis* Muell.-Arg. in Linnaea 34: 115. 1865; in DC. Prodr. 15^2: 609. 1866, and *C. Eggersii* Pax (in Engl. Bot. Jahrb. 26: 503. 1899). The complexity of the range of this aggregate southward is illustrated by the appearance of a form, undistinguishable from the plant of the lowlands of Ecuador (*Eggers 14235*: Balao; *Haught 3005*: Pedro Carbo, Guayas) in the Bolivian Yungas, at about 2000 meters (*Rusby 1197; 1885*). It would seem, on the whole, that *C. ferrugineus* merges both with *C. rivinaefolius* and *C. Holtonis,* being an essentially alpine form, while the last two reach much lower levels. Collections that I believe to belong to *C. Holtonis* are: *Haught 2118* and *2129,* Depto. de Caldas, La Dorada, 200-400 m.

(4) **Croton malacophyllus** Benth., Pl. Hartw. 248. 1846; Muell.-Arg. in DC. Prodr. 15^2: 610. 1866 (as *C. leptostachyus malacophyllus*).

The type-locality is "Prope pagum Villeta, prov. Bogotá" (= Villeta, Depto. of Cundinamarca). This is either a more hispid state of *C. leptostachyus genuinus,* or an altitudinal extreme form of the same species. I have seen only one specimen which belongs here: *Pennell 2704*: Cundinamarca, Fusagasugá, 1800-2300 m.

(5) **Croton dolichostachyus** Pittier in Jour. Wash. Acad. Sc. 20: 9. 1930.

I cannot separate this and *C. truxillanus* Pittier, cited below, even as varieties. This entity, which appears to differ from *C. leptostachyus* in the more acuminate foliage, and indeed not much else, aside from the range, occurs in North-Eastern Colombia: *Killip & Smith 15401* and *15420,* Depto. Santander, Mesa de Los Santos, 1000-1500 m.; *Killip & Smith 16193* and *16225,* Valle del Río Suratá; and in Western Venezuela: *Pittier 12616,* Lara (Type coll. of *C. dolichostachyus*); *Pittier 10820,* Trujillo (Type-coll. of *C. truxillanus*).

(6) **Croton truxillanus** Pittier in Jour. Wash. Acad. Sc. 20: 9. 1930.

See notes under *C. dolichostachyus.*

(7) **Croton meridensis** Croiz. In Jour. Arnold Arb. 21: 91. 1940.

An alpine form with small, rotundate leaves, so far only known from *Jahn 1063,* Mérida, Páramo del Morro 2500 m. This was interpreted by Pittier (in Jour. Wash. Acad. Sc. 20: 10. 1930) as the true *C. ferrugineus* HBK.

To attempt an inmediate disposition of this group proves almost impossible, for the "species", as I have noticed, is merely a loose aggregate or forms, each "species" merging with the other. The material I have at hand is undoubtedly ample for purposes or ordinary determination, but is certainly not adequate for a critical study. The very great majority of my specimens, for instance, have no seed, which must be had before anything is attempted to classify *Croton* with a semblance of finality. It is probable that in this group the original Kunthian recognition of separate species was better than the later Muellerian involved treatment with confusing subordinations. I propose the following as a preliminary:

Croton ferrugineus HBK. var. **genuinus** Muell.-Arg. in DC. Prodr. 15^2: 611. 1866.
Range: El Valle, Cauca, Nariño.
var. **Holtonis** (Muell.-Arg.) comb. nov.
Range: El Valle, Antioquia. Distinct from the type-variety in the less pubescent, and apparently larger leaves. A comparatively northern form of rather low lands.

Croton leptostachyus HBK. var. **genuinus** Muell.-Arg. in DC. Prodr. 15^2: 610. 1866.
Range: Tolima, Cundinamarca.
var. **truxillanus** (Pittier) comb. nov.
Syn.: *C. dolichostachyus* Pittier.
Range: Western Venezuela, North-Eastern Colombia, Distinct from the type-variety in the more acuminate, and less pubescent leaves.

It is probable that a final revision of this group, including as it must also every form from Ecuador, Peru and Bolivia, will reveal that *C. ferrugineus* and *C. leptostachyus* are conspecific. The outline I propose is a bare indication of what may be required by later studies. The position of *C. malacophyllus* and *C. meridensis* must remain conjectural, until field-study is conducted to determine whether these entities are occasional states, or local, probably altitudinal, segregates.

Croton sexmetralis sp. nov.

Arbuscula ad 6 m. alta. Innovationibus luteo-brunneis furfuraceo-lepidotis. Foliis 5-10 cm. longis, 2-5 cm. latis, ovato-ellipticis vel ovato-lanceolatis, cuspidato acuminatis, rotundato-subcordatis, integris, firme chartaceis, supra glabratis saturate brunneis indumento raro substriguloso, subtus albicantibus subargenteis furfuraceo-lepidotis, venis penninerviis adscendentibus ad marginem anastomosatis ca. 10-12 jugis, trabeis manifestis, costa valida, glandulis posticis patelliformibus sat magnis 2, stipulis petiolaribus late ovato-triangularibus ad 5 mm. longis latisque, petiolo 1 - 1.5 cm. longo. Inflorescentiis apicalibus, congestis, stipulis lineari-lanceolatis alabastra longe excedentibus. Flore ♂ campanulato-infundibiliformi, 5 mm. longo totidemque lato, lobis ca. 3 mm. longis, staminibus 5 mm. longis 15-17, filamento basi hispidulo. Caetera desunt.

Depto. del Magdalena: Santa Marta, Sierra Nevada, Casa Blanca, 1200 m. alt., *Schultze 338* (in herb. Berol., frustulum in herb. Arnold Arbor.).

The type-material of my new species is a free-grown shoot, with male flowers only, and is probably not representative. It might ultimately prove to be a state of *C. argyrophyllus* H.B.K., but, as the matter now stands, it much sooner suggests a distinct entity near *C. Blanchetianus* Baill. from Brazil, and *C. bixoides* Vahl from the West Indies, than anything else. I have diligently compared *Schultze 338* with Colombian and Venezuelan material of *C. argyrophyllus* (*Triana 5827-7* in Herb. Nac. Colomb., apparently the same as *Triana 3642,* cited by Mueller-Argoviensis in DC. Prodr. 15 (2): 555. 1866; *Pittier 10507*: Zulia, Veras Altas; *Williams 13409*: Bolívar, El Tigre), and learned that *C. argyrophyllus* has much smaller flower-buds, depressed rather than ovoid-costate; in addition, *C. sexmetralis* has on the average 15-17 stamens (some may be replaced by glands in certain flowers), while *C. argyrophyllus* has no more than 12, with anthers only half as long. *Glaziou 14253* which represents the Brazilian *C. tricolor* Kl. in our herbarium bears exceptionally large leaves, which I believe to be a match of those of *Schultze 338*. Considering that *C. tricolor* Kl. is very close to *C. argyrophyllus* in every one of its characters, the leaves of *Glaziou 14253* and *Schultze 338* ought to be very much alike, were *C. sexmetralis* but a state of *C. argyrophyllus.* On the contrary, the leaves of *Schultze 338* have a strong venation which dones not fade toward the margin, well marked tertiaries, and manifest blackish glands, all of which is quite unlike *C. tricolor*. In conclusion, the evidence suggests that *Croton sexmetralis* is a species of the group which embraces, together with *C. Blanchetianus* Baill. and *C. bixoides* Vahl, two of my own Colombian species, *C. cucutensis* and *C. badiocalyx,* and is not closely related with *C. argyrophyllus* HBK. It is not surprising that a new species with such affinities should turn up at 1200 m. in the Sierra Nevada de Santa Marta.

Plukenetia Linnaeus

Plukenetia chaponensis sp. nov.

Frutex alte volubilis, ramulis adpresse crispuleque puberulis, indumento albido vel pallide brunneo. Foliis ovatis vel ovato-lanceolatis, cuspidatis, cuspide apice subdilatata, margine (videtur) eroso-glandulosa, basi coarctato-cuneata latius maculoso-glandulosis, 7-11 cm. longis, 4-6 cm. latis, margine haud profunde glanduloso-serratis, supra glabris subnitidis, subtus ad venas saltem puberulis, venis ca. 4-jugis, primo jugo tertium laminae superum attingente, ad latere bene ramoso; petiolo 1.5 - 2.5 cm. longo, stipulis glandulosis minimis. Racemis ca. 8 cm. longis, axillaribus, basi ca. 1 cm. nudis, dein floribus 1-2 ♀ auctis, caeterum ♂. Flore ♂: perianthio 3-4 mm. lato, 3 (-4 ?)-lobo; columna staminali vix 2 mm. longa, bene cylindrica gracilioreque, staminibus ca. 20, staminodiis sat numerosis baculiformibus vel clavatis intermixtis. Flore ♀: subsessili, pedicello pro ratione crasso vix 1 mm. longo; perianthii laciniis triangulari-acuminatis vix 1 mm. longis, ovario (videtur) globuloso ca. 1 mm. magno vel minore, exalato, stylo crasso glabro nigro ad 5-6 mm. longo, apice irregulariter in cruribus 3-4 apice vix lobulatis partito, ca. 2 mm. longis.

Depto. Boyacá: región of Mt. Chapón, 1200 m. alt. "High climbing, insect-infested vine", *Lawrance 276* (in herb. Arnold. Arb.).

The alliance to which *Plukenetia* belongs needs careful revision, and some of its genera probably require reduction. The supposed generic characters used to break up this alliance (nature of the style, whether elongate or flattened; nature of the androecium, whether columnar with anthers borne upon evolute, free filaments, or globose and fleshy, with sessile anthers) do not impress me either as constant, or as very significant for generic segregation. As treated by Pax & Hoffmann (in Engl. Pflanzenr. iv. 147. ix-xi: 12019. 1919), *Plukenetia* falls into two Sections, *Cylindrophora* Muell.-Arg. ("Columna stylaris cylindrica, elongata. Capsula magna, profunde 4-loba, dorso carpidiorum alato-carinata") and *Euplekenetia* Muell.-Arg. ("Columna stylaris obovoidea. Capsula mediocris, coccis dorso bituberculatis"). By reason of its style, *P. chaponensis* falls under Sect. *Cylindrophora* to which Pax & Hoffmann credit only *P. volubilis* L., *P. macrostyla* Ule and *P. polyadenia* Muell.-Arg., the last still being for them *species dubiae*.

Klug 2266: Peru, Depto. Loreto, Florida, distributed erroneously as *"Plukenetia volubilis"*, well agrees with the descriptions of *P. macrostyla,* and the photograph of its type-specimen, *Ule 5864*: Brazil, Amazonas, "Oberer Rio Juruá bei Jaburú", and has stamens with "filamenta basi incrassata". In my opinion, *P. polyadenia,* based upon *Poeppig 2385*: "Alto Amazonas, Maynas", appears to be exactly the same as *P. macrostyla* (*P. polyadenia* Muell.-Arg. in Mart. Fl. Bras. 11^2: 334. 1874=*P. macrostyla* Ule in Verhandl. Bot. Ver. Brandeb. 50: 80. 1908. Syn. Nov.). The baffling "Receptaculum subconicum, crebre glandulis squamiformibus, lobatis, quam stamina numerosioribus undique ornatum", described by Pax & Hoffmann (in *op. cit.* 15), is apparently an inflated staminal column, with the filaments "basi incrassata" (well apparent upon *Klug 2266*) shorn of their anthers. *Plukenetia polyadenia* is to be looked for in Colombia as a matter of course, and certainly differs from *P. chaponensis,* which bears a manifest, comparatively slender true staminal column.

In *P. volubilis,* as undesrtood by Mueller Argoviensis (in DC. Prodr. 15^2: 771. 1866), and by Pax & Hoffmann (in *op. cit.* 14). the pedicel of the ♀ flower is elongate, and the staminal column is slender, up to 2.5 cm. long, which is quite unlike *P. chaponensis.* In two other forms of this affinity, *P. loretensis* Ule and *P. Buchtienii* Pax, which Pax & Hoffmann (*in op. cit.* 20) treat under a distinct genus, *Apodandra* Pax & Hoffmann, the stamens are said to be "15-35 receptaculo globoso, plicato-rugoso, basi glandulis disci parvis, liberis vel plus minusve confluentibus cincto inmerso-insidentia; filamenta nulla". *Plukenetia loretensis* (Loc. class.: "Loreto bei Iquitos") may be also looked for in Amazonian Colombia; its androecium will easily separate it from *P. chaponensis.*

I may add that Mt. Chapón, in the western part of Depto. Boyacá, is a region of peculiar endemism, which is bound to repay further study.

Sapium P. Browne

Sapium verum Hemsl. in Hook Ic. 27: *pl. 2647.* 1900 *p. p. typ.;* Pax & Hoffm. in Engl. Pflanzenr. IV. 147. V: 211. 1912; Pittier in Contr. U. S. Nat. Herb. 18^2: 70 *pl. 42-43.* 1914; Croiz. in Caldasia II, 7: 133. 1943.

In identifying *Pérez-Arbeláez & Cuatrecasas 5255* as of this species, I have pointed out that its characters well agreed with those illustrated by Hemsley, emphasizing the nature of the fruit. Also in these pages (notes under *S. putumayense* Croiz. *op. cit.* 132) I have mentioned that *S. stylare* Muell.-Arg. is the only species recorded in the literature which is said to have auriculate leaves.

Material collected only very recently, *Cuatrecasas 13564*: Cundinamarca, Cordillera Oriental, entre Sebastopol y Alto de las Escaleras, 2300-2400 m., 1942, reveals that it is possible to have on the same plant leaves which are glandular and auriculate at the base, or not so. It seems well established, consequently, that the nature of the base of the leaf-blade cannot be accepted as a reliable character, considering that *Pérez-Arbeláez & Cuatrecasas 5255* and *Cuatrecasas 13564* are the same species, to the full extent at least that one may decide without seeing ripe fruits and seeds.

To rectify the erroneous data now accepted in the literature it may be suggested that species of *Sapium* with *usually* auriculate and glandular base of the leaf-blade, range as follows:

Central to Western Venezuela	*Sapium stylare* Muell.-Arg.
?Eastern to Central Colombia (upper *tierra templada* and lower *tierra fría,* fide Pittier)	*Sapium verum* Hemsl.
Southern Colombia	*Sapium putumayense* Croiz.

The material on which I have published *S. Cuatrecasasii* (in Journ. Arnold Arbor. 24: 172. April 15, 1943) and *S. putumayense* (Caldasia II, 7: 132. June 30, 1943) is not comparable, but one of the differences between these entities is a glandular auriculate base of the leaf appearing in *S. putumayense,* not in *S. Cuatrecasasii.* Since these two species have the same range, it will be necessary to check them with good material, to determine whether they might not be synonymous. Good material is also needed to make light on the status of *S. tolimense* Jum. discussed at length by Pittier. (*in op. cit.*).

Sapium Marmieri Huber in Bol. Mus. Goeldi 3: 367. 1902; Pax & Hoffm. in Engl. Pflanzenr. iv. 147: 256. 1912; Croizat in Jour. Arnold Arb. 24: 174. 1943.

The collection from Tolima, *Pérez-Arbeláez & Cuatrecasas 6490,* which I mention, *loc. cit.,* as an interesting "extension of the range" of this Amazonian species, is really a mixture in our herbarium of *Cuatrecasas 7490* (original label without indication of locality) and of *Pérez-Arbeláez & Cuatrecasas 6490* (locality indicated in label). Dr. J. Cuatrecasas has informed me that his plant was collected in the "Comisaría del Vaupés: margen del Río Guaviare, más arriba de San José", and bears the number *7490* of *Cuatrecasas,* 7-XI-1939.